K071101

SUMMARY OF SAFETY AND EFFECTIVENESS

IDENTIFICATION INFORMATION

SUBMITTER'S INFORMATION

OCT 18 2007

This summary of 510(k) safety and effectiveness is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.20.

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DATE SUMMARY PREPARED: September 27, 2007

TRADE NAME: TRU RSV

COMMON NAME: Rapid, qualitative lateral-flow immunoassay for the detection of Respiratory Syncytial Virus antigens.

CLASSIFICATION NAME: Antigen, CF (including CF control), Respiratory Syncytial Virus

REGULATION: 866.3480

INTENDED USES:
TRU RSV is a rapid, qualitative, lateral-flow immunoassay for the detection of Respiratory Syncytial Virus (RSV) antigens (fusion protein or nucleoprotein) in human nasal wash, nasopharyngeal aspirate, and nasal and nasopharyngeal swab samples. It is designed to test specimens from symptomatic patients aged 5 years or less. A negative result does not preclude RSV infection. It is recommended that all negative test results be confirmed by cell culture.

PREDICATE DEVICE:
TRU RSV is a modification of, and is intended to detect the same analytes as, Immuno*Card* STAT! RSV PLUS (K041445), manufactured by Meridian Bioscience, Inc.

BACKGROUND:
Respiratory Syncytial Virus (RSV) is the most important cause of pneumonia and bronchiolitis in infants and small children. Approximately 90,000 children are hospitalized each year due to RSV in the USA alone. Hospitalization due to RSV is more frequently associated with children that have underlying disease or premature birth. Mortality rates are estimated to be between 1 and 3% for children that are hospitalized with RSV. RSV is also being recognized more frequently as a cause of significant respiratory disease in the elderly. RSV causes a wide range of respiratory symptoms that can be difficult to distinguish clinically from symptoms caused by other respiratory viruses such as influenza. Because of its high infectivity, the potential for prolonged patient shedding and the ability of the virus to survive for hours on environmental surfaces, RSV has emerged as a serious cause of nosocomial infection. RSV can be detected in human respiratory samples by a variety of methods including, immunofluorescent assay and enzyme immunoassay. Although is still considered the diagnostic test standard, it requires facilities and may take a week to complete. Immunofluorescent antibody-based tests are reasonably sensitive, yet highly dependent on specimen quality and preparation. Enzyme and microparticle-based immunoassays have become one the most frequently used methods for the detection of

RSV. TRU RSV is a lateral flow-based immunoassay for the rapid detection of RSV in human respiratory samples. The results from this test are used to support data available from the patient's clinical evaluation and assist the physician in determining a course of action.

Type of test

TRU RSV is a rapid, single-use, qualitative lateral-flow immunoassay screening test.

Specimen type

The following specimens have been found compatible with TRU RSV.

1. Nasal wash
2. Nasopharyngeal aspirate
3. Nasopharyngeal swab
4. Nasal swab

Conditions for use

TRU RSV is designed for use by laboratory professionals under the normal environmental conditions. The assay is stored at 2-25 C. Reagents must be at room temperature (20-25 C) to perform testing. Normal laboratory lighting, humidity and temperature do not affect the performance of the assay.

Contraindications

There are no contraindications associated with the use of this product.

Special instrument requirements

No instruments are used with this product.

Combination with other medical devices

No other medical devices are used in combination with this device.

Table 1. Comparison charts TRU RSV vs Predicate Device.

Characteristics	*TRU RSV*	*ImmunoCard STAT! RSV PLUS (predicate)*
Device Type		
Technology	Single use, rapid, lateral flow immunoassay	Single use, rapid, lateral flow immunoassay
In vitro diagnostic device	Yes	Yes
Control	Excludes external control reagent (purchased separately)	Excludes external control reagent (purchased separately)
Calibrator	No	No
Intended Use		
Detection of RSV antigen	Yes	Yes
Screening test	No	No
Diagnostic test	Yes	Yes
Identification test	No	No
Monitoring therapy	No	No
Acceptable Samples		
Swab -- Nasal	Yes	Yes
Swab -- Nasopharyngeal	Yes	Yes
Wash -- Nasal	Yes	Yes
Aspirate -- Nasopharyngeal	Yes	Yes
Reagents/Components Provided		
Nitrocellulose test strip	Yes (attached to plastic holder/tube closure)	Yes (enclosed in plastic frame)
Conjugate reagent	Yes (supplied as dried bead in Conjugate Tube)	Yes (supplied in conjugate pad attached to test strip)
Reading Guide	Yes (part of plastic holder/tube closure)	Yes (part of plastic frame)
Sample Diluent/Negative Control (external)	Yes	Yes
Internal procedural control	Yes	Yes
External positive control	No (purchased separately)	No (purchased separately)
Source of RSV antibodies	Capture: Murine monoclonal anti-RSV (antibodies to fusion protein and nucleoprotein) Detector: Murine monoclonal anti-RSV (antibodies to fusion protein and nucleoprotein)	Capture: Murine monoclonal anti-RSV (antibodies to fusion protein and nucleoprotein) Detector: Murine monoclonal anti-RSV (antibodies to fusion protein and nucleoprotein)

Table 2. Comparison of TRU RSV method to predicate

Comparison of assay steps*	***TRU RSV***	***ImmunoCard STAT! RSV PLUS (Predicate)***
Technology	Lateral-flow, colloidal gold-based immunoassay	Lateral-flow, colloidal gold-based immunoassay
Test Reagents	1. Test Strip (nitrocellulose membrane with immobilized capture antibody). Top end is inserted into plastic frame or holder. 2. Conjugate Tube containing antibody- colloidal gold conjugate (lyophilized bead) 3. Sample Diluent/Negative Control External Positive Control sold separately as adjunct reagent	1. Test Device (Test Card with nitrocellulose membrane with immobilized capture antibody, conjugate pad with colloidal gold particle-linked detector antibody, plastic frame with reading/reaction window and sample port). 2. Sample Diluent/Negative Control External Positive Control sold separately as adjunct reagent.
Specimen Type	1. Nasal wash 2. Nasopharyngeal aspirate 3. Nasal swabs 4. Nasopharyngeal swabs	1. Nasal wash 2. Nasopharyngeal aspirate 3. Nasal swabs 4. Nasopharyngeal swabs
Equipment Required	No	No
Level of skill required	Complexity: Moderate	Complexity: CLIA Waived
Assay steps	1. Add 100 µL Sample Diluent to the Conjugate Tube. 2. Add 100 µL sample to the Conjugate Tube and mix. 3. Insert Test Strip to Conjugate Tube. 4. Press down on cap of Test Strip to seal Conjugate Tube. 5. Incubate 15 min, 20-25 C. 6. Read at end of incubation using guide on holder..	1. Add 4 drops Sample Diluent to a test tube. 2. Add 150 µL sample and mix. 3. Add 150 µL diluted specimen to Test Device. 4. Incubate 15 min, 20-25 C. 5. Read at end of incubation using guide at reaction window.
End point	Appearance of pink-red color at Test and/or Control lines	Appearance of pink-red color at Test and/or Control lines
Interpretation of test result	RSV Positive = appearance of pink-red lines at Test and Control Line positions (indicates presence of RSV antigens) Negative = no test line color with pink-red Control Line (indicates absence of RSV antigens)	RSV Positive = appearance of pink-red lines at Test and Control Line positions (indicates presence of RSV antigens) Negative = no test line color with pink-red Control Line (indicates absence of RSV antigens)

* Note: Differences are underlined to facilitate their detection.

DEVICE DESCRIPTION AND TECHNOLOGICAL PRINCIPLES

Reagents

TRU RSV is distributed as a test kit that includes the following reagents:

1. **Test Strip:** A test strip attached to a plastic frame or holder enclosed in a foil pouch with desiccant. The test strip carries monoclonal anti-RSV capture antibodies (to fusion proteins and nucleoproteins) for the test lines. The holder is used to stopper the Conjugate Tube. The paddle portion of the holder indicates where test and control lines should appear.
2. **Conjugate Tube:** A capped plastic tube containing a conjugate bead. The tube is enclosed in a foil pouch. The conjugate consists of gold-conjugated anti-RSV (to fusion proteins and nucleoproteins), which serves as the detector antibodies.
3. **Sample Diluent/Negative Control:** A buffered protein solution provided in a dropper vial. Sodium azide (0.094%) added as a preservative. Use as supplied.
4. Plastic transfer pipettes with 50, 100, 200 and 300 µL volume marks.

Equipment needed to use the device

There is no equipment needed to use this device.

Interfering substances

Whole blood, at concentrations greater than 2.9% may interfere with the interpretation of test results. Chlorpheniramine maleate at concentrations greater than 1.7 mg/mL may cause false-positive test results.

Calibrators

There are no calibrators used with this device.

Controls

The assay includes an internal procedural CONTROL line that is used to determine if the test has been performed correctly, proper flow occurred and that reagents were reactive at the time of use. A clean background around the RSV TEST and CONTROL lines also serves as a procedural control. Control or test lines that are obscured by a heavy background color may invalidate the test and may be an indication of reagent deterioration, use of an inappropriate sample or improper test performance.

Positive Control Reagent is supplied separately. It is used in parallel with Sample Diluent/Negative Control as external controls. These reagents also serve as indicators that the test was performed correctly, that the capture and detector antibodies were active at the time of use, and that the membrane supports proper sample flow.

Failure of the internal and external controls to produce the expected results suggests the test was not performed correctly (ie, incorrect volume of reagents added; incorrect incubation temperature or times used or that reagents were not brought to room temperature prior to testing).

Technological principles

TRU RSV is a single use capture immunoassay to detection RSV in human samples. The test consists of a Conjugate Tube, a Test Strip and Sample Diluent. The Conjugate Tube contains a lyophilized bead of colloidal gold-linked monoclonal antibodies to RSV fusion protein and nucleoprotein (detector antibodies). The Test Strip carries a nitrocellulose membrane with dried capture antibodies placed at a designated Test Line for RSV. The Test Strip holder caps the Conjugate Tube during testing and subsequent disposal to reduce exposure to potential pathogens.

The conjugate bead is first rehydrated in the Conjugate Tube with Sample Diluent. Patient sample is then added, the contents mixed and the Test Strip added. If RSV antigens are present, they first bind to the monoclonal antibody-colloidal gold conjugate. When the sample migrates up the Test Strip to the Test Line, the antigen-conjugate complex is bound to the capture antibody, yielding a pink-red line. When no

antigen is present, no complexes are formed and no pink-red line appears at the Test Line. An internal control line helps determine whether adequate flow has occurred through the Test Strip during a test run. A visible pink-red line at the Control position of the Test Strip should be present each time a specimen or control is tested. If no pink-red control line is seen, the test is considered invalid.

PERFORMANCE EVALUATION – CLINICAL/FIELD TRIALS

Study Objective

A clinical/field study was conducted to demonstrate that TRU RSV was substantially equivalent in performance to the standard reference method – tissue culture – in a clinical laboratory setting using samples submitted for RSV testing.

Investigational plan

Clinical studies evaluated the performance of TRU RSV against tissue culture in the laboratory setting. Four independent laboratories in different geographic of the US and the manufacturer's laboratory tested a total of 625 samples from symptomatic patients under 5 years of age and that had been submitted for RSV testing. Three hundred four of the samples were collected during the 2006-07 season and tested fresh, while 321 were tested as frozen/thawed samples. Frozen samples were collected during the 2006-07 and earlier seasons and tested by tissue culture before freezing. Samples were evenly distributed among male and female patients. Samples that produced different test results in TRU RSV than in tissue culture were tested by direct specimen fluorescence assay (DSFA) or by a polymerase chain reaction (PCR) assay. Those found to be RSV positive by DSFA or PCR are indicated in the postscripts to the tables below.

Sample population and selection

The sample population used in this study included respiratory samples from patients 5 years or less provided the samples had been submitted for RSV testing. Such samples were assumed to be from symptomatic patients. The sample types included nasal wash, nasopharyngeal aspirate and throat, nasal and nasopharyngeal swabs.

Influence of other disease states

There is no influence by other disease states on test results.

Patient exclusion criteria

Samples from asymptomatic patients were excluded from the trials. Patients, whose specimens were submitted to the laboratory for RSV testing, were assumed to be symptomatic. There were no patient exclusion criteria with respect to medications or other therapies, age, or gender. The performance of TRU RSV was not established for patients greater than 5 years of age.

Clinical trial test system

Clinical trial sites employed full production lots of TRU RSV test kits. Tissue cultures were performed by each laboratory's established internal method. Three of the four independent laboratories completed reproducibility studies prior to testing patient samples. Reproducibility studies are described later in this section.

Clinical study data

Tables 3-5 provide an analysis of patient ages and sample type. Table 3 describes the types of samples tested; Table 4 identifies the age groups of the patients from whom samples were collected during the study, and Table 5 identifies the gender of the patients. The 2 x 2 tables that summarize test outcomes for each site are given in Table 6.

Table 3. Description of sample types evaluated in clinical studies

	Specimen Type		
	Wash/NPA	Swab	Total
Total tested -- Clinical Site 1			
Total tested	54	0	54
Total fresh	54	0	54
Total frozen	0	0	0
Total tested -- Clinical Site 2			
Total tested	10	27	37
Total fresh	5	24	29
Total frozen	5	3	8
Total tested -- Clinical Site 3			
Total tested	169	54	223
Total fresh	0	0	0
Total frozen	169	54	223
Total tested -- Clinical Site 4			
Total tested	200	55	255
Total fresh	125	40	165
Total frozen	75	15	90
Total tested -- Clinical Site 5			
Total tested	0	56	56
Total fresh	0	56	56
Total frozen	0	0	0
Total tested -- All Sites			
Total tested	429	196	625
Total fresh	180	124	304
Total frozen	249	72	321

Legend: NPA = nasopharyngeal aspirate

Table 4. Categories of patients by age from who samples were collected for clinical studies

Patient Age	birth to 1 month	>1 month to 2 years	>2 years to 5 years	Total
Clinical site 1				
Total tested	11	37	6	54
Clinical site 2				
Total tested	0	36	1	37
Clinical site 3				
Total tested	39	169	15	223
Clinical site 4				
Total tested	57	168	30	255
Clinical site 5				
Total tested	1	31	24	56
Clinical site Totals				
Total tested	108	441	76	625

Table 5. Classification of patients from whom samples were collected based on sex

	Specimen Type			
	Male	Female	Not defined	Total
Clinical site 1				
Total tested	32	22	0	54
Total TRU RSV positive	10	11	0	21
Total TRU RSV negative	22	10	0	32
Total invalid	0	1	0	1
Clinical site 2				
Total tested	21	16	0	37
Total TRU RSV positive	12	9	0	21
Total TRU RSV negative	9	7	0	16
Total invalid	0	0	0	0
Clinical site 3				
Total tested	125	96	2	223
Total TRU RSV positive	48	28	2	78
Total TRU RSV negative	77	68	0	145
Total invalid	0	0	0	0
Clinical site 4				
Total tested	139	116	0	255
Total TRU RSV positive	55	50	0	105
Total TRU RSV negative	84	66	0	150
Total invalid	0	0	0	0
Clinical site 5				
Total tested	32	24	0	56
Total TRU RSV positive	1	3	0	4
Total TRU RSV negative	31	21	0	52
Total invalid	0	0	0	0
Clinical site Totals				
Total tested	349	274	2	625
Total TRU RSV positive	126	101	2	229
Total TRU RSV negative	223	172	0	395
Total invalid	0	1	0	1

Table 6. Summary --Distribution of TRU RSV results by sample type and by site

Fresh Wash /Aspirate Site 1	TRU RSV*		
Tissue Culture	Positive	Negative	Total
Positive	7	1	8
Negative	14	31	45
Total	21	32	53
Sensitivity	7/8	87.5%	47.3 - 99.7%
Specificity	31/45	68.9%	53.4 - 81.8%
Correlation	38/53	71.7%	57.6 - 83.2%

*1 TRU RSV Invalid

Fresh Wash /Aspirate Site 2	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	3	0	3
Negative	0	2	2
Total	3	2	5
			%
Sensitivity	3/3	100.0%	29.2 - 100%
Specificity	2/2	100.0%	15.8 - 100%
Correlation	5/5	100.0%	47.8 - 100%

Fresh Wash /Aspirate Site 4	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	54	7	61
Negative	7	57	64
Total	61	64	125
Sensitivity	54/61	88.5%	77.8 - 95.3%
Specificity	57/64	89.1%	78.8 - 95.5%
Correlation	111/125	88.8%	83.3 - 94.3%

Fresh Wash /Aspirate Total	TRU RSV*		
Tissue Culture	Positive	Negative	Total
Positive	64	8	72
Negative	21**	90	111
Total	85	98	183
Sensitivity	64/72	88.9%	79.3 - 95.1%
Specificity	90/111	81.1%	73.8 - 88.4%
Correlation	154/183	84.2%	78.9 - 89.4%

*1 TRU RSV Invalid
** Of the 21 TRU RSV false-positive results, 3 were positive by DSFA.

Frozen Wash /Aspirate Site 2	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	5	0	5
Negative	0	0	0
Total	5	0	5
Sensitivity	5/5	100.0%	47.8 - 100%
Specificity	0/0	N/A	N/A
Correlation	5/5	100.0%	47.8 - 100%

Frozen Wash /Aspirate Site 3	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	40	7	47
Negative	10	112	122
Total	50	119	169
Sensitivity	40/47	85.1%	71.7 - 93.8%
Specificity	112/122	91.8%	85.4 - 96.0%
Correlation	152/169	89.9%	85.4 - 94.5%

Frozen Wash /Aspirate Site 4	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	34	2	36
Negative	2	37	39
Total	36	39	75
Sensitivity	34/36	94.4%	81.3 - 99.3%
Specificity	37/39	94.9%	82.7 - 99.4%
Correlation	71/75	94.7%	86.9 - 98.5%

Frozen Wash /Aspirate Total	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	79	9	88
Negative	12*	149	161
Total	91	158	249
Sensitivity	79/88	89.8%	81.5 - 95.2%
Specificity	149/161	92.5%	87.3 - 96.1%
Correlation	228/249	91.6%	87.4 - 94.7%

* Of the 12 TRU RSV false-positive results, 2 were positive by DSFA.

Fresh Swab Site 2	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	8	1	9
Negative	4	11	15
Total	12	12	24
Sensitivity	8/9	88.9%	51.8 - 99.7%
Specificity	11/15	73.3%	44.9 - 92.2%
Correlation	19/24	79.2%	57.8 - 92.9%

Fresh Swab Site 4	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	3	0	3
Negative	0	37	37
Total	3	37	40
Sensitivity	3/3	100.0%	29.2 - 100%
Specificity	37/37	100.0%	90.5 - 100%
Correlation	40/40	100.0%	91.2 - 100%

Fresh Swab Site 5	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	1	0	1
Negative	3	52	55
Total	4	52	56
Sensitivity	1/1	100.0%	N/A
Specificity	52/55	94.5%	84.9 - 98.9%
Correlation	53/56	94.6%	85.1 - 98.9%

Fresh Swab Total	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	12	1	13
Negative	7*	100	107
Total	19	101	120
Sensitivity	12/13	92.3%	64.0 - 99.8%
Specificity	100/107	93.5%	87.0 - 97.3%
Correlation	112/120	93.3%	87.3 - 97.1%

* Of the 7 TRU RSV false-positive results, 4 were positive by PCR.

Frozen Swab Site 2	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	1	0	1
Negative	0	2	2
Total	1	2	3
Sensitivity	1/1	100.0%	N/A
Specificity	2/2	100.0%	15.8 - 100%
Correlation	3/3	100.0%	29.2 - 100%

Frozen Swab Site 3	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	27	12	39
Negative	1	14	15
Total	28	26	54
Sensitivity	27/39	69.2%	52.4 - 83.0%
Specificity	14/15	93.3%	68.0 - 99.8%
Correlation	41/54	75.9%	62.4 - 86.5%

Frozen Swab Site 4	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	5	1	6
Negative	0	9	9
Total	5	10	15
Sensitivity	5/6	83.3%	56.5 - 84.0%
Specificity	9/9	100.0%	66.4 - 100%
Correlation	14/15	93.3%	68.0 - 99.8%

Frozen Swab Total	TRU RSV		
Tissue Culture	Positive	Negative	Total
Positive	33	13	46
Negative	1	25	26
Total	34	38	72
Sensitivity	33/46	71.7%	56.5 - 84.0%
Specificity	25/26	96.2%	80.4 - 99.9%
Correlation	58/72	80.6%	69.5 - 88.9%

NOTE: As the data above indicates, the performance characteristics generated from prospective frozen specimens might not be the same as the performance characteristics generated from prospective fresh specimens.

Sixty three TRU RSV +, culture – and TRU – culture + samples were further analyzed by direct specimen fluorescence assay (DSFA), or PCR to evaluate the accuracy of the reference result. In 9 cases, retesting was not possible due to the quantity of sample remaining, or the fact the sample was not stored correctly after initial testing. Repeat results are given in Table 7. Nine of 41 initially TRU +, culture – samples were shown to contain RSV antigen by DSFA or PCR testing, confirming the original TRU RSV results.

Table 7. Analysis of samples producing discrepant results against tissue culture

Site Number	Specimen #	Specimen Type	Fresh/ Frozen	TRU RSV Result	Culture Result	Additional or repeat Testing and comments
1	3	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	8	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	10	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	14	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	15	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	17	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	18	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	20	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	26	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	27	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	30	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	35	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	38	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
1	47	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	
4	78	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	DSFA negative
4	82	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	**DSFA Positive for RSV**
4	87	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	**DSFA Positive for RSV**
4	188	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	DSFA Negative for RSV
4	216	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	DSFA Negative
4	217	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	DSFA Negative
4	223	Nasal Wash	Fresh	**Positive RSV**	Negative RSV	**DSFA Positive for RSV**

Table 7 Continued

Site Number	Specimen #	Specimen Type	Fresh/ Frozen	TRU RSV Result	Culture Result	Additional or repeat Testing and comments
3	40	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
3	62	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
3	125	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
3	137	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
3	178	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
3	192	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
3	195	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
3	249	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
3	264	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
3	266	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	
4	117	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	**DSFA Positive for RSV**
4	145	Nasal Wash	Frozen	**Positive RSV**	Negative RSV	**DSFA Positive for RSV**
2	40	Nasal Swab	Fresh	**Positive RSV**	Negative RSV	**PCR Positive for RSV**
2	6	Nasopharyngeal Swab	Fresh	**Positive RSV**	Negative RSV	**PCR Positive for RSV**
2	25	Nasopharyngeal Swab	Fresh	**Positive RSV**	Negative RSV	**PCR Positive for RSV**
2	38	Nasopharyngeal Swab	Fresh	**Positive RSV**	Negative RSV	**PCR Positive for RSV**
5	44	Nasal Swab	Fresh	**Positive RSV**	Negative RSV	
5	47	Nasal Swab	Fresh	**Positive RSV**	Negative RSV	
5	50	Nasal Swab	Fresh	**Positive RSV**	Negative RSV	
3	161	Nasopharyngeal Swab	Frozen	**Positive RSV**	Negative RSV	

Table 7 Continued

Site Number	Specimen #	Specimen Type	Fresh/ Frozen	TRU RSV Result	Culture Result	Additional or repeat Testing and comments
1	51	Nasal Wash	Fresh	Negative RSV	**Positive RSV**	
4	6	Nasal Wash	Fresh	Negative RSV	**Positive RSV**	**DSFA Positive for RSV**
4	24	Nasal Wash	Fresh	Negative RSV	**Positive RSV**	**DSFA Positive for RSV**
4	32	Nasal Wash	Fresh	Negative RSV	**Positive RSV**	
4	75	Nasal Wash	Fresh	Negative RSV	**Positive RSV**	**DSFA positive for RSV**
4	90	Nasal Wash	Fresh	Negative RSV	**Positive RSV**	
4	136	Nasal Wash	Fresh	Negative RSV	**Positive RSV**	**DSFA positive for RSV**
4	147	Nasal Wash	Fresh	Negative RSV	**Positive RSV**	**DSFA Positive for RSV**
3	7	Nasal Wash	Frozen	Negative RSV	**Positive RSV**	
3	9	Nasal Wash	Frozen	Negative RSV	**Positive RSV**	
3	12	Nasal Wash	Frozen	Negative RSV	**Positive RSV**	
3	42	Nasal Wash	Frozen	Negative RSV	**Positive RSV**	
3	52	Nasal Wash	Frozen	Negative RSV	**Positive RSV**	
3	56	Nasal Wash	Frozen	Negative RSV	**Positive RSV**	
3	197	Nasopharyngeal Aspirate	Frozen	Negative RSV	**Positive RSV**	
4	54	Nasal Wash	Frozen	Negative RSV	**Positive RSV**	**DSFA Positive for RSV**
4	60	Nasal Wash	Frozen	Negative RSV	**Positive RSV**	**DSFA Positive for RSV**
2	16	Nasopharyngeal Swab	Fresh	Negative RSV	**Positive RSV**	**PCR Positive for RSV**
3	207	Nasal Swab	Frozen	Negative RSV	**Positive RSV**	
3	226	Nasal Swab	Frozen	Negative RSV	**Positive RSV**	
3	2	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	
3	165	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	
3	173	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	
3	180	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	
3	181	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	
3	212	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	

Table 7 Continued

Site Number	Specimen #	Specimen Type	Fresh/ Frozen	TRU RSV Result	Culture Result	Additional or repeat Testing and comments
3	220	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	
3	224	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	
3	234	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	
3	238	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	
4	166	Nasopharyngeal Swab	Frozen	Negative RSV	**Positive RSV**	

Reproducibility

Assay precision, intra-assay variability and inter-assay variability were assessed with a reference panel prepared from pools of negative samples spiked with specific virus. The reproducibility panel consisted of high positive (n = 2), low negative (n = 2), and low positive (n = 3) and high negative specimens (n = 3). The latter were prepared near the assay limit of sensitivity. (EP12-A, User protocol for evaluation of qualitative performance; approved guideline; NCCLS/CLSI, Vol. 22, no.14, 2002.) Each reference specimen was coded to prevent its identification during any test cycle. Each sample was evaluated twice per day for three consecutive days by three different laboratories. The results of reproducibility evaluations are shown in Table 8 below.

High negative samples (viral load just below LoD) and low negative samples produced negative results in all replicate tests performed with each sample type. Low positive (viral load just above the LoD) and high positive samples produced the positive results 100% of the time. High positive samples always produced results that were stronger than those of low positive samples with the exception of Sample LP 5. This sample produced a reaction nearing the strength of a high positive on Day 2, Run 2 at Site 1. The result, regardless of its strength, was the correct result. Reproducibility was 100% with no intra-assay and inter-assay variability for samples prepared above or below the limit of analytical sensitivity.

Table 8. Results of reproducibility evaluations

		Reproducibility																	
		Site 1						Site 2						Site 3					
Sample ID	Sample Qual. Result	Day 1 Run 1	Day 1 Run 2	Day 2 Run 1	Day 2 Run 2	Day 3 Run 1	Day 3 Run 2	Day 1 Run 1	Day 1 Run 2	Day 2 Run 1	Day 2 Run 2	Day 3 Run 1	Day 3 Run 2	Day 1 Run 1	Day 1 Run 2	Day 2 Run 1	Day 2 Run 2	Day 3 Run 1	Day 3 Run 2
1 - HP	5.5	4	4	4	5	4	4	5	2	5	5	5	5	5	5	5	5	4	5
2 - HP	5.5	4	5	5	5	3	3	6	4	5	5	4	2	5	5	4	5	5	5
3 -- LP	1.5	3	3	2	3	2	1	2	2	2	3	2	2	2	1	1	2	2	2
4 -- LP	1.5	2	2	3	3	2	2	2	2	3	2	2	1	1	1	1	1	2	2
5 -- LP	1.5	2	2	1	4	1	1	2	1	2	2	2	3	1	2	2	2	2	2
6 – HN	0	0	0	0	0	0	0	0	0	0	0	NT	0	0	0	0	0	0	0
7 -- HN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 -- HN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 -- LN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 -- LN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ave high neg value		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ave low pos value		2.3	2.3	2.0	3.3	1.7	1.3	2.0	1.7	2.3	2.3	2.0	2.0	1.3	1.3	1.3	1.7	2.0	2.0
Percent Correlation	100%																		
Correlation of cut off Specimens	100%							Over all Correlation	100%										

Legend: HP = high positive; LP = low positive (just above limit of detect); HN = high negative (just below limit of detect); LN = low negative

Analytical sensitivity

The analytical sensitivity of this assay was established in tests with dilutions of 3 RSV A strains (VR-26, VR-1302, VR-1540) and 3 RSV B strains (VR-955, VR-1400, VR-1401). The lower limit of detection (see table below) is dependent on factors such as cell culture lines used, the number of passages performed and the effectiveness of the isolation methods. For these reasons, assay limit of detection levels may vary if other strains or samples are used.

Strain ID	Strain Type	Limit of Detection (LoD) $TCID_{50}$/mL
VR-26	A	2.49×10^{2}
VR-1302	A	4.47
VR-1540	A	5.52×10^{1}
VR-955	B	4.47
VR-1400	B	1.10×10^{1}
VR-1401	B	2.47

Assay specificity

The specificity of TRU RSV was tested utilizing the following bacterial, viral and yeast strains. RSV positive and negative respiratory specimens were spiked with $\geq 4 \times 10^{7}$/mL bacteria or yeast. Viruses were tested at levels $\geq 6.7 \times 10^{4}$ $TCID_{50}$/mL. None of the microorganisms tested yielded a positive result in the RSV-negative sample or interfered with detection of the RSV-positive sample. The RSV-negative respiratory sample was positive when spiked with RSV strain VR-26.

Adenovirus Types 1, 5 and 7A, Coxsackie Type A9, Human Coronavirus Types 229E and OC43, Cytomegalovirus, Influenza A (2 strains), Influenza B (1 strain), Human metapneumovirus, Measles, Parainfluenza Types 1, 2 and 3, Rhinovirus Type 39, *Bacillus cereus, Bacillus subtilis, Bordetella parapertussis, Bordetella pertussis, Branhamella catarrhalis, Candida albicans, Candida glabrata, Citrobacter freundii, Enterobacter cloacae, Escherichia coli, Haemophilus influenzae, Klebsiella oxytoca, Klebsiella pneumoniae, Listeria monocytogenes, Legionella pneumophila, Neisseria cinerea, Neisseria gonorrhoeae, Neisseria meningitidis, Nocardia asteroides, Proteus vulgaris, Pseudomonas aeruginosa, Pseudomonas fluorescens, Serratia liquifaciens, Staphylococcus aureus, Staphylococcus aureus* (Cowan I), *Staphylococcus epidermidis, Streptococcus (not typed), Streptococcus Groups A, B, D, F, and G, Streptococcus pneumoniae.*

A clinical sample containing Epstein Barr virus at 2.32×10^{8} genome equivalents/mL was nonreactive with TRU RSV.

Tests for interfering substances

The following substances, when introduced directly into nasal samples, do not interfere with testing at the concentrations identified: Acetaminophen (10 mg/mL), Acetylsalicylic acid (20 mg/mL), Albuterol (9.1% v/v), Halls® Throat Drops (20 mg/mL), Ludens® Throat Drops (20 mg/mL), Chlorpheniramine maleate (1.7 mg/mL), Clemastine fumarate (5mg/mL), Diphenhydramine HCl (5 mg/mL), Dextromethorphan (9.1% v/v), Naproxen sodium (10 mg/mL), Phenylephrine hydrochloride (9.1% v/v), Oxymetazoline (9.1% v/v), Guaifenesin (9.1% v/v), Pseudoephedrine HCl (20 mg/mL), Listerine® Mouthwash (9.1% v/v).

Whole blood at concentrations greater than 2.9% interfered with test interpretation. Chlorpheniramine maleate at concentrations greater than 1.7 mg/mL may cause false-positive test results.

CONCLUSIONS

TRU RSV:

1. Can be used reliably in the clinical laboratory for the rapid detection of RSV antigens in the sample types defined in product labeling, and
2. Performs similarly to its predicate Immuno*Card* STAT! RSV.

BIBLIOGRAPHY

1. Cote PJ, Fernie BF, Ford EC et al. Monoclonal antibodies to respiratory syncytial virus: determination of virus neutralization and other antigen-antibody systems using infected human and murine cells. J Virol Meth 1981;3:137-47.
2. Swenson PD, Kaplan MH. Rapid detection of respiratory syncytial virus in nasopharyngeal aspirates by a commercial enzyme immunoassay. J Clin Microbiol 1986;23:485-8.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
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OCT 18 2007

Susan Rolih
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Re: k071101
Trade/Device Name: TRU RSV
Regulation Number: 21 CFR 866.3480
Regulation Name: Respiratory syncytial virus serological reagents
Regulatory Class: Class I
Product Code: GOG
Dated: October 5, 2007
Received: October 10, 2007

Dear Ms. Rolih:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to such additional controls. Existing major regulations affecting your device can be found in Title 21, Code of Federal Regulations (CFR), Parts 800 to 895. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Parts 801 and 809); and good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820).

This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Office of In Vitro Diagnostic Device Evaluation and Safety at 240-276-0450. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). For questions regarding postmarket surveillance, please contact CDRH's Office of Surveillance and Biometric's (OSB's) Division of Postmarket Surveillance at 240-276-3474. For questions regarding the reporting of device adverse events (Medical Device Reporting (MDR)), please contact the Division of Surveillance Systems at 240-276-3464. You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (240) 276-3150 or at its Internet address http://www.fda.gov/cdrh/industry/support/index.html.

Sincerely yours,

Sally A. Hojvat, M.Sc., Ph.D.
Director
Division of Microbiology Devices
Office of *In Vitro* Diagnostic Device
Evaluation and Safety
Center for Devices and
Radiological Health

Enclosure

INDICATIONS FOR USE STATEMENT
TRU RSV

510(K) Number: K071101

TRU RSV is a rapid, qualitative, lateral-flow immunoassay for the detection of Respiratory Syncytial Virus (RSV) antigens (fusion protein or nucleoprotein) in human nasal wash, nasopharyngeal aspirate and nasal and nasopharyngeal swab samples. It is designed to test specimens from symptomatic patients aged 5 years or less. A negative result does not preclude RSV infection. It is recommended that all negative test results be confirmed by cell culture.

Prescription Use ___X___ AND/OR Over-The-Counter Use _____
(Part 21 CFR 801 Subpart D) (21 CFR 807 Subpart C)

Concurrence of CDRH, Office of In Vitro Diagnostic Devices (OIVD)

Division Sign-Off

Office of In Vitro Diagnostic Device
Evaluation and Safety

510(k) K071101